

310-218

176,629 COMPLETE SPECIFICATION

176,629

1 SHEET

Fig. 1.

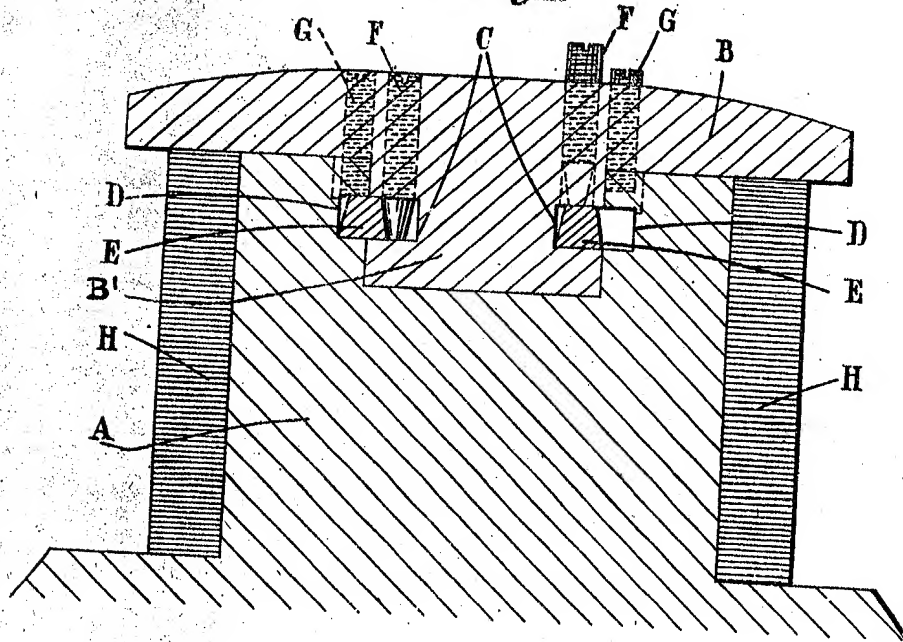
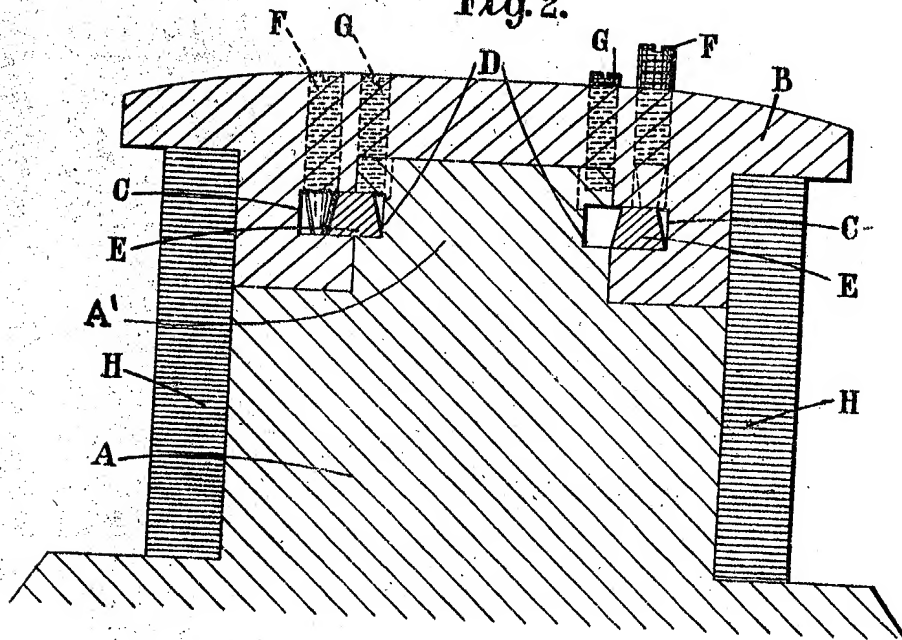


Fig. 2.



[This Drawing is a reproduction of the Original on a reduced scale.]



Div 26

# PATENT SPECIFICATION

Application Date: Feb. 10, 1921. No. 4749/21.

176,629

Complete Left: Nov. 10, 1921.

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## PROVISIONAL SPECIFICATION.

### An Improved Construction of the Field Magnets of Dynamo-electric Machines.

I, JOHN WHITELEY HOWARD, of 3, Rose Cottages, Doxey Road, Stafford, in the County of Staffordshire, a subject of the King of England, do hereby declare the nature of this invention to be as follows:—

This invention relates to the field structures of dynamo electric machines and deals particularly with salient poles, being primarily intended for application to rotating structures especially those intended for running at high speeds.

It is common practice to construct each salient pole of two parts, the main or body part and the head part. The former may actually be an integral portion of the main field structure.

The head portion necessarily comprises the pole face and the projecting tips. It may also comprise a portion of the stem of the pole. A common method of attaching the head and body parts together has been one in which a dovetail or T shaped projection (or a series of these projections) has been formed on one of the members with a correspondingly shaped recess (or recesses) in the other, the engagement being brought about by sliding one part relative to the other in a direction parallel with the axis of the machine. The principal objection to such an arrangement is that whereas in general the exciting coil has to be placed in position before the joint is made, this coil cannot be of such a length as to cover the whole of the body of the pole since the engaging projections and recesses are located in the outer part of the pole body. The result of this is that a portion of the space which should be available for the field coil is wasted, this portion being of appreciable length in the case of high speed machines in

order that the necessary strength of the joint may be produced.

This invention provides a form of joint which does not necessitate the relative axial sliding of the parts so that the coil may occupy the whole of the length of the pole from the root to the tips. The joint is made by providing one or more projections on one of the parts with a corresponding recess or recesses in the other part, these being formed so that the parts can be brought into close relationship by movement in a direction roughly parallel with the axis of the pole. To secure the joint, one of the members is provided with one or more undercut recesses or grooves and the other member carries in it key pieces which can be projected from it into the recesses or grooves so as to key the two parts together. The movable pieces will generally be carried by the head part and this part will have formed in it holes extending through to its outer surface from the housing of each key piece so that a screw or pin or other device may be applied through each hole to the key piece to project it so that it lies partly in its housing and partly in the recess in the body part of the pole.

A convenient form of construction is one in which either the body or the head part is provided with a rectangular recess extending over its full length and the other part is provided with a correspondingly shaped projection. In each side wall of the projection or recess of the head part is arranged a longitudinal keyway housing a key extending the full length of the pole and fitting the keyway. In the pole body are formed keyways similarly shaped and placed. Through the head part are drilled a number of holes entering the keyways at or near the

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back thereof and adapted to receive set screws arranged or formed so that when they are screwed down into the holes they force the keys sideways so that they project from their housings.

In order to permit of the dismantling of the pole structure, for instance for the purpose of removing the coil, a second set of adjusting screws may be provided, adapted to act in the opposite sense to those previously mentioned.

In place of set screws, it is obvious that any device can be employed by means of which the necessary pressure can be inserted to move the key pieces in their housings.

Dated this 10th day of February, 1921.

R. L. CLEAVER,

Chartered Patent Agent,  
Room 109, Caxton House (East Block),  
Westminster, London, S.W. 1.

### COMPLETE SPECIFICATION.

#### An Improved Construction of the Field Magnets of Dynamo-electric Machines.

I, JOHN WHITELEY HOWARD, of 3, Rose Cottages, Doxey Road, Stafford, in the County of Staffordshire, a subject of the Kingdom of England, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:

This invention relates to the field structures of dynamo electric machines and deals particularly with salient poles, being primarily intended for application to rotating structures especially those intended for running at high speeds.

It is common practice to construct each salient pole of two parts, the main or body part and the head part. The former may actually be an integral portion of the main field structure.

The head portion necessarily comprises the pole face and the projecting tips. It may also comprise a portion of the stem of the pole. A common method of attaching the head and body parts together has been one in which a dovetail or T shaped projection (or a series of these projections) has been formed on one of the members with a correspondingly shaped recess (or recesses) in the other, the engagement being brought about by sliding one part relative to the other in a direction parallel with the axis of the machine. The principal objection to such an arrangement is that whereas in general the exciting coil has to be placed in position before the joint is made, this coil cannot be of such a length as to cover the whole of the body of the pole since the engaging projections and recesses are located in the outer part of the pole body. The result of this is that a portion of the space which should

be available for the field coils is wasted, this portion being of appreciable length in the case of high speed machines, in order that the necessary strength of the joint may be produced.

This invention provides a form of joint which does not necessitate the relative axial sliding of the parts so that the coil may occupy the whole of the length of the pole from the root to the tips. The joint is made by providing one or more projections on one of the parts and a corresponding recess or recesses in the other part, these being formed so that the parts can be brought into close relationship by movement in a direction roughly parallel with the axis of the pole. To secure the joint, one of the members is provided with one or more undercut recesses or grooves and the other member carries in it key pieces which can be projected from it into the recesses or grooves so as to key the two parts together. The movable pieces will generally be carried by the head part and in that case this part will have formed in it holes extending through to its outer surface from the housing of each key piece so that a screw or pin or wedge or other device may be applied through each hole to the key piece to project it so that it lies partly in its housing and partly in the recess in the body part of the pole. Similar but oppositely acting means may be provided, acting for instance through other holes in the head part, to return the key piece from its effective position into its housing.

Two convenient forms of construction will now be described, by way of example, with reference to the drawings Figs. 1 and 2 which show sectional views through



the salient poles in planes normal to the shaft of the machine in a manner which will be well understood.

In Figure 1 the head part B is provided with a rectangular projection 11' extending over its whole length and the main or body part A, which is an integral portion of the main field structure, is provided with a correspondingly shaped recess. In each side wall of the projection of the head part is arranged a longitudinal recess or groove in the shape of a keyway C housing a key E extending the full length of the pole and fitting the keyway. In the main or body part A are formed keyways D similarly shaped and placed. The vertical sides of the keys E are slightly tapered as shown either generally or locally. Through the head part is drilled a number of holes F entering the keyways at or near the back thereof and adapted to receive set screws with conically shaped ends so that when these screws are in position as shown on the left hand side of Figure 1 they force the keys E sideways so that the latter project from the keyways C into the keyways D thus locking the parts A and B securely together. Wedges can be used in the holes F to perform the initial movement of the keys E. Should it become necessary at any time to separate the parts A and B this may be done by slackening back the set screws in the holes F and removing the set screws with flat ends in the holes G. Wedges can then be inserted in the holes G and the keys E forced back into the position shown on the right hand side of Figure 1 when the part A may be lifted from the part B. If desired the set screws in the holes G may, under working conditions, be screwed tightly down upon the keys E when they will serve to take up any slack between the parts A and B. The holes G extend through the head part B only and below them are slots in the part A through which the flat ended set screws can pass when being screwed down upon the keys E. The set screws in the holes F and G will preferably be screwed down until their heads are slightly below the outer contour line of the head part B and the edges of these holes can then be

slightly burred over for the purpose of locking the set screws in position. The winding upon the pole is represented by H and is usually in the form of copper strip wound upon its edge.

In Figure 2, which is similar to Figure 1, the head part B is provided with a rectangular recess extending over its whole length and the body part A is provided with a correspondingly shaped projection A'. The letters denoting the several parts agree with those denoting similar parts in Figure 1 and the exact arrangement and operation will be clear on reference to the foregoing description. In Figure 2 the top of the projection A' on the body part A is provided with slots to correspond with the holes G.

In place of set screws and wedges, it is obvious that any device can be employed by means of which the necessary pressure can be provided to move the keys in their housings.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. In pole structures for dynamo electric machines having a head part and a body part, providing one or more projections on one of the parts and a corresponding recess or recesses in the other part, formed in such a manner that the parts can be brought into close relationship by movement in a direction roughly parallel with the axis of the pole, and forming one or more recesses or grooves in one of the members into which keys or movable pieces housed in corresponding recesses in the other member can be projected, substantially as and for the purpose described.

2. Pole structures for dynamo electric machines arranged substantially as described with reference to the accompanying drawings.

Dated this 10th day of November, 1921.

R. L. CLEAVER,  
Chartered Patent Agent,  
Room 109, Caxton House (East Block),  
Westminster, London, S.W. 1.